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UEHARA HIROHIDE**(54) STEEL SHEET FOR DEEP DRAWING, EXCELLENT IN SURFACE CHARACTERISTIC AND STRETCH-FLANGE FORMABILITY, AND ITS MANUFACTURE**

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a steel sheet excellent in surface characteristic and stretch- flange formability, and its manufacture.

SOLUTION: The steel sheet, contains, by weight, $\geq 0.010\%$ C, $\leq 1.0\%$ Si, $\leq 3.0\%$ Mn, $\leq 0.15\%$ P, $\leq 0.05\%$ S, $\leq 0.01\%$ N, $0.010\text{--}0.50\%$ Ti, $0.001\text{--}0.1\%$ Nb, $0.0001\text{--}0.05\%$ B, and $\leq 0.0005\%$ Ca and/or metallic REM and also contains $0.005\text{--}0.1$ wt.% of non-oxide Ti(Ti*) and contains Al in an amount satisfying (1) wt.% Ti/wt.% Al ≥ 5 or (2) Al ≤ 0.010 wt.% and wt.% Ti/wt.% Al < 5 , and further, the average size of oxide inclusions is regulated to ≤ 3 μm and $\geq 90\%$ of the oxide inclusions contains the oxide inclusions with a size of ≤ 10 μm . At the time of its manufacture, a slab is heated and soaked at 900 to $1,300^\circ\text{C}$, finish rolling is finished at 650 to 960°C , coiling is done at 400 to 750°C , cold rolling is carried out at 50 to 95% draft, and the resultant sheet is subjected to recrystallization annealing at 700 to 920°C .

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